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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

INVENTOR(S)	:	James M. Ziobro
TITLE	:	**INTELLIGENT COLOR TO TEXTURE CONVERTER**
APPLICATION NO.	:	09/725,384
FILED	:	November 29, 2000
CONFIRMATION NO.	:	6573
EXAMINER	:	Montilewa Good Johnson
ART UNIT	:	2672
LAST OFFICE ACTION	:	May 17, 2005
ATTORNEY DOCKET NO.	:	A0125Q-US-NP XERZ 2 00404

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request. This request is being filed with a Notice of Appeal. Applicant respectfully submits the following 5 pages including reasons for requesting a Pre-Appeal Review of the above-captioned matter.

The Present Application

The subject application is related to rendering black and white versions of color images. The problem addressed is that to render black and white versions of color images, millions of colors must be mapable to, for example, 256 shades of gray available from a typical black and white rendering device or printer. One way to map color pixels to black and white gray levels is to determine a luminance or lightness level associated with the color of the pixel and to render the black and white version of the pixel according to the luminance. However, this means that many different colors will be mapped to the same gray level. This is generally not a problem when the image to be rendered in black and white is a photograph. However, when the image is a business graphic, such as map, bar chart or pie chart, having, for example, a key or legend defining elements according to colors, if a red bar and a green bar in a bar graph happen to have the same luminance, a black and white version of the graph mapped to black and white strictly according to luminance can be rendered useless because the red bar and the green bar will be rendered with the same shade of gray and the legend can no longerbe used to identify which bar is which.

"The solution provided by the present application is to analyze an input color image to look for colors that have the same luminance (or other parameter used to map the colors to black and white gray levels), classify such colors as "conflicting" and apply special processing to at least some of the conflicting colors. For simplicity, the rest of this discussion will refer to luminance. However, it should be understood that some other characteristic can be substituted for luminance.

As indicated above, the present application refers to colors having the same or similar luminance (such that they would be rendered with the same black and white gray level) as conflicting colors. When a pair of conflicting colors is found in an image, a texture or modulation is applied to the black and white version of at least one of them. For example, please compare FIG. 2 and FIG. 10 from the present application. Without the reference numerals, it is respectfully submitted that the viewer could not tell which wedge is meant to refer to notions and which wedge is meant to refer to meat in FIG. 2. However, those wedges are clearly identified in FIG. 10.

An advantage of the methods disclosed in the present application is that since texturing is added to only black and white versions of some of the conflicting colors, distortions to images are minimized. This allows the process to be implemented in a default or "walkup mode" in a copier, because even if a copied image is a color photograph, only conflicting colors will be affected.

The Cited References

In stark contrast, none of the cited references address a problem of rendering a black and white version of a color image while maintaining a distinctiveness for conflicting colors.

The primary reference, to U.S. Patent No. 6,088,137 to Tomizawa, is directed toward a Specified Image Area Extracting Method and Device. For example, Tomizawa discusses identifying faces in images within, for example, a video screen, so that relatively lossless compression can be applied to this important portion and heavy/lossy compression can be applied to other portions of the images.

The first secondary reference, to U.S. Patent No. 6,516,100 to Qian, is directed toward a Method for Image Characterization Using Color and Texture statistics with embedded spatial information. While Qian includes the word "texture" and some of the images include stripes, Qian does not disclose or suggest a method for rendering black and white images. Instead, it is respectfully submitted that Qian seeks to automatically characterize images so that they can be indexed by image content and included in digital image libraries (column 1, lines 11-17).

The second secondary reference, to U.S. Patent No. 5,900,886 to Shay, is directed toward a Display Controller Capable of Accessing an External Memory for Gray Scale Modulation Data. Shay explains that, in general, an LCD controller receives graphics data and then generates and provides the appropriate ones and zeros to a display panel which are needed to display the specified shade of gray for each pixel in the frame. Because of the nature of LCD displays, "gray scale modulation" is done in a temporal (or time) and spatial modulated way. According to Shay, **in order to prevent flickering**, adjacent **pixels of the same gray value will be modulated at different frequencies** (column 2, lines 3-16). Shay uses similar terms to terms used in some of the claims of the present application. However, the terms are used in a different context.

It is respectfully submitted that no combination of Tomizawa, Qian or Shay discloses or suggests a method system or apparatus wherein conflicting colors are identified or wherein the spatial modulation is applied to black and white versions of selected ones of the conflicting colors so that some distinctiveness is provided for the conflicting colors (e.g., FIG. 10) in a black and white version of the color image.

For example, independent **claim 4** recites:

> A method for rendering an image described in a multi-color color space, in a single-colorant color space, the method comprising:
>
> collecting histogram information from the multi-color color space image wherein bins within the histogram classify image pixels based on luminance information and hue information;
>
> **classifying peaks within the histogram that have similar luminance as conflicting colors**; and
>
> applying at least one distinct spatial modulation to, **and only to, at least one respective single colorant version of at least one of the conflicting colors**, thereby ensuring that all single colorant versions of colors in the image are visually distinguishable from one another while

minimizing distortions in a remainder of the single colorant version of the image.

It is respectfully submitted that none of the cited references, alone or in combination, disclose or suggest at least the highlighted elements of **claim 4**.

For example, the Office Action relies on column 7, lines 32-35, of Tomizawa for disclosure of classifying peaks within the histogram that have similar luminance as conflicting colors. However, the cited portion of Tomizawa reads as follows: "a face area of the input original image in the color space is discriminated by detecting peaks (frequency distributions) above a noise level in respective histograms, and a threshold for the face area in the input color space is determined.

It is respectfully submitted that **nothing in this cited portion of Tomizawa discloses or suggests conflicting colors or classifying** peaks within a histogram that have similar luminance **as conflicting colors**.

Furthermore, the Office Action stipulates that Tomizawa fails to disclose the last element of claim 4. Instead, the Office Action divides the last element into three separate pieces and cites three separate portions of Qian.

For disclosure of --applying at least one distinct spatial modulation--, the Office Action cites column 3, lines 10-15, of Qian, which describe "a method for characterizing and image comprising the steps of defining a spatial structural element including a plurality of picture elements, delineating on the image a number of test areas corresponding to the spatial structural element, and quantifying the color or, in the alternative, the texture of the image in the delineated areas.

For disclosure of --to, and only to, at least one representative single colorant version of at least one of the conflicting colors--, the Office Action cites column 3, lines 40-45, which include portions of the descriptions of FIG. 5 and FIGS. 6A and 6B. FIG. 5 is an image for characterization with a single square feature and a single circular feature where each feature has an area equal to four features of the same geometric shape in FIG. 4. FIGS. 6A and 6B illustrate two similar images having features of the same size and shape, but which have been translated and rotated.

For disclosure of --thereby ensuring that all single colorant versions of colors in the image are visually distinguishable from one another while minimizing distortions in a remainder of the single colorant version of the image--, the Office Action cites column 6, lines 15-29. However, the cited paragraph discusses aspects of FIG. 7, which is an exemplary illustration of resulting image data for a first aspect of the method of Qian.

The figures of Qian include shaded or cross-hatched circles, squares and triangles. However, Qian is related to analyzing an image to determine parameters such as those illustrated in FIG. 7 for the purpose of classifying and indexing an image. Qian simply does not disclose or suggest applying at least one distinct spatial modulation to, and only to, at least one representative single colorant version of at least one of the **conflicting colors**, thereby ensuring

that all single colorant versions of colors in the image are visually distinguishable from one another while minimizing distortions in a remainder of the single colorant version of the image.

Furthermore, it is noted that the Office Action suggests no motivation for combining Tomizawa and Qian.

Claim 10 recites:

> An image processor operative to generate a single colorant version of a color image, the single colorant version including modulations only where necessary to distinguish between conflicting colors, the image processor comprising:
>
> an image analyzer operative **to find and classify conflicting colors** in the color image; and
>
> a gray scale modulator operative to add spatial modulations to single colorant versions **of only the conflicting colors** within the single colorant version of the color image.

The Office Action relies on Tomizawa for disclosure ofan image analyzer operative to find and classify conflicting colors in the color image and cites column 7, lines 24-38. However, it is submitted that the first paragraph of the cited portion is directed toward discussion of preparing three histograms for image data that has been previously determined to be the pixels of a face area of the original image read from frame memory. The second paragraph of the cited portion indicates that "a face area of the input original image in the color space is discriminated by detecting peaks (frequency distribution) above a noise level in respective histograms, and a threshold for the face area in the input color space is determined. The obtained threshold is outputted to a face area extracting portion 4."

It is respectfully submitted that disclosure of detecting peaks above a noise level does not disclose or suggest an image analyzer operative to **find and classify conflicting colors** in a color image.

Additionally, the Office Action stipulates that Tomizawa fails to disclose a gray scale modulator operative to add spatial modulations to single colorant versions of only the conflicting colors within the single colorant version of the image.

Instead, the Office Action cites FIG. 9, element 58 and column 8, lines 33-36, of Shay. "FIG. 9 is a more detailed block diagram illustrating the display controller showing FIG. 1 of Shay." However, it is respectfully submitted that the gray scale modulator/inverse video block (element 58) of Shay generates shades of gray by varying the duty cycle of a particular pixel on a display device. Column 8, lines 3-11, indicate that gray scale pixels are turned on and off during successive scans. The rate in which they are turned on and off determines how dark or light they appear. Because of the nature of LCD displays, this modulation is done in a temporal or time modulated way. Flickering is prevented by modulating adjacent pixels **of the same gray value** at different frequencies using phase delay. Lines 13-15 indicate that "although the duty

cycles are the same, adjacent or nearby gray pixels will not be modulated identically, a process referred to as spatial modulation."

It is respectfully submitted that this use of the phrase --spatial modulation-- is in a completely different context and has a completely different meaning than the reference to --spatial modulations-- found in the second element of claim 10 of the present application. Disclosure of modulating adjacent pixels of an LCD display at different frequencies, but with the same duty cycle, in order to generate the perception of the **same gray level** without the sensation of flicker does not disclose or suggest adding spatial modulations to single colorant versions of **only the conflicting colors within a single colorant version of a color image** (e.g., FIG. 10). Furthermore, **Tomizawa and Shay are not concerned with conflicting colors**. For at least the foregoing reasons, **claims 4-23** are not anticipated and are not obvious in light of Tomizawa, Qian and Shay taken alone or in any combination.

For at least the foregoing reasons, Pre-Appeal Brief Review is requested. Additional errors in the reasoning and assertions of the Final Office Action with regard to these claims and the dependent claims can be found in Applicant's Amendment C and Response D.

Reconsideration of the Restriction Requirement is Also Requested

The Response to Restriction Requirement and Preliminary Amendment filed March 5, 2003 and received in the Office on March 17, 2003 traversed the restriction requirement with regard to claims 1-3 as they were originally filed. Applicant's Amendment A traversed the restriction requirement after amending claims 2 and 3. Reconsideration of the Restriction Requirement is also requested.

Respectfully submitted,

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